

FOUR LARVAL TROMBIDIIDAE FROM BRITISH NORTH BORNEO
(ACARINA: TROMBIDIIDAE).

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(Twelve Text-figures.)

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These specimens were very kindly brought to me from British North Borneo by Mr. George M. Rio, of Bulolo; he obtained them from the mouse deer.

Genus TROMBICULA Berlese 1905.

Redia, ii, fasc. 2, 155.

TROMBICULA BODENSIS, n. sp. Figs. 1, 2, 3.

Body oval, widest at level of coxae iii. Striations fine and well-defined; pitting very strong, on scutum, maxilla, and coxae. Colour orange. L,* 235 μ ; W, 211 μ ; newly-hatched, 150 \times 134 μ ; largest seen, 363 \times 250 μ . Maxillary setae short, slightly curved, with fine branches on the convex side. Chelicerae short and stout; dorsoapical tooth single, blunt; ventral tooth tiny, sharp, opposite the dorsoapical. A nude seta on each cheliceral sheath. Palpi rounded; a curved nude seta on ii; a similar seta on iii; on iv, a short nude seta near the base, a longer finer one half-way. Appendiculum very small, flattened, bearing a short stout spur and about four branched setae. Palpal claw bifurcate; the ventral element stout and straight but with a curved blunt tip; the dorsal element fine and sharp. Scutum oblong, twice as wide as long; L, 37.5 μ ; W, 75 μ . Anterior margin smoothly concave; anterior corners angular, projecting laterally; lateral margins concave; posterior margin sinuate, slightly convex opposite the pseudostigmata; posterior corners angular, projecting laterally. Scutal setae 5, stout, with short branches on all sides. The AM back from the anterior margin, behind the AL; the lateral setae in the corners. AM, 47 μ ; AL, 38 μ ; PL, 50 μ . Pseudostigmata near the posterior margin, just in front of the PL setae; 28 μ apart. Pseudostigmatic organs filiform, with a few short branches on the distal third; L, 60 μ . Ocular shield 3 μ from scutum. Eyes double, the anterior slightly larger, set opposite the pseudostigmata; the posterior behind the PL setae. Body setae 60(64); those of the dorsum and the last row of the venter stout, with short branches on all sides; the remainder of the venter finer and shorter with fine branches on the convex side only. Dorsum, setae 30(32), in rows as follows: 2, 8, 6, 6, 6, 2(4). Venter, setae 30(32), in rows as follows: 2, 2, 10(8), 4(8), 4, 4, / 4; the anus is between rows 5 and 6. Legs relatively long: i, 180 μ ; ii, 125 μ ; iii, 200 μ . Leg setae slender, slightly curved, with fine branches on the convex side. Coxal setae single. Bases of sixth segments not unduly constricted, apices not unduly expanded. Tarsi i and ii stout and blunt; tarsus iii longer and narrower. A relatively long, stout spur on tarsi i and ii; no long nude seta on iii.

Principal host; Water chevrotain, mouse deer, *planduk* (*Tragulus borneanus* Miller 1902), colonies on legs, Bode River, near Sandakan, British North Borneo, August, 1939.

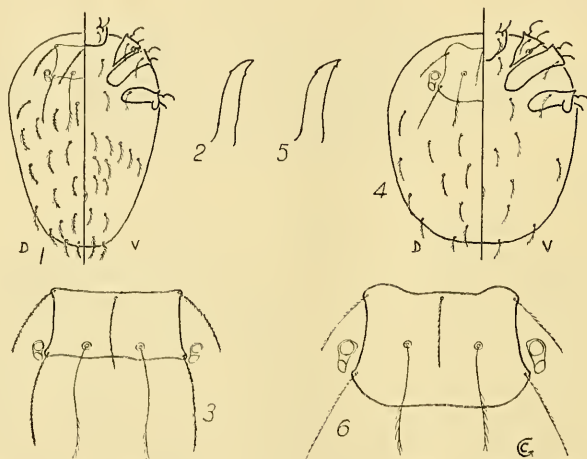
Type specimen at the School of Public Health and Tropical Medicine, University of Sydney.

* As in previous papers, AL = anterolateral, AM = anteromedian, PL = posterolateral, L = length, W = width.

TROMBICULA WICHMANNI Oudemans 1905. Figs. 4, 5, 6.

Entomol. Bericht., i, No. 22, 217.

On the same host were several colonies of another *Trombicula* which corresponds almost exactly with Oudemans' description of *T. wichmanni*. This description is a very careful and complete one, but unfortunately few measurements are given, and the old style of naming the segments of the appendages is followed. The old nomenclature is cumbersome and confusing; a numerical system is to be preferred. After much hesitation, and with considerable diffidence, the writer has decided to offer the following supplementary description, based on his own specimens, for the purpose of bringing it into line with recent work; and to incorporate certain measurements, particularly of the scutum, by the aid of which quicker and easier comparison of species can be made possible. It has been thought desirable to give a complete description rather than to set out mere supplementary notes, since those alone would be useless without the original paper to refer to.



Figs. 1-3.—*Trombicula bodensis*, n. sp. 1, Composite dorsal and ventral diagram. 2, Chelicera. 3, Scutum.

Figs. 4-6.—*Trombicula wichmanni* Oudemans 1905. 5, Chelicera. 6, Scutum.

Body a blunt oval, flattened posteriorly in newly-hatched larvae, bluntly rounded in older ones. Widest just behind coxae iii. Striations fine and weak, especially on the venter and the posterior portion of the dorsum. Pitting strong on the scutum, but very fine, arranged along fine striations, on the maxilla and coxae. Colour orange. L, 297 μ ; W, 232 μ ; newly-hatched, 168 \times 150 μ ; largest seen, 416 \times 292 μ . Maxillary setae fine, curved, with long branches on the convex side. Chelicerae short, stout, curved; dorso-apical tooth single, small, blunt; ventral tooth nearer the apex, sharp and squared. A fine nude seta on each cheliceral sheath. Palpi angular; a stout seta with a few branches on ii; a nude seta on iii; on iv, two nude setae and one branched seta. Appendiculum rounded, bearing a short spur at the base, one nude and four branched setae towards the apex. Palpal claw bifurcate, the elements almost equal, stout, sharp, curved. Scutum rounded, concave before and convex behind, half as wide again as long; L, 64 μ ; W, 95 μ . Anterior margin strongly convex in the lateral fourths, concave and sinuate in the middle; anterior corners slightly angular, at the junction of the lateral and anterior margins; lateral margins slightly concave; posterior margin strongly convex, the middle three-fifths straight, the lateral fifths curving forward; posterior corners angular and projecting. Scutal setae 5, almost straight, slender, with short fine branches on the convex side; the AM in line with the AL; the lateral setae in the corners. AM, 36 μ ; AL, 38 μ ; PL, 54 μ . Pseudostigmata half-way back, 37.5 μ apart. Pseudostigmatic organs filiform, fine, with six long branches on the distal half; L, 56.3 μ . Ocular shield 5 μ from the scutum (further in fully-engorged specimens). Eyes double,

the anterior the larger, set opposite the pseudostigmata; the posterior opposite the PL setae. Body setae 40: those of the dorsum stout, with very fine short branches on the convex side; those of the venter finer and shorter, with relatively longer branches. Dorsum, setae 22, arranged in rows as follows: 2, 6, 6, 4, 2, 2; row 6 is on the posterior margin of the body. Venter, setae 18, in rows as follows: 2, 2, 4(2), 2(4), 2, 4, 2; in older specimens rows 3 and 4 merge into one; the anus lies between rows 5 and 6; row 7 is on the posterior margin of the body. Legs relatively long: i, 225 μ ; ii, 210 μ ; iii, 240 μ . Leg setae fine, long, curved, with fine branches on the convex side. Coxal setae single. Bases of sixth segments all constricted, apices expanded. A short nude seta on the apex of the sixth segments of legs i and ii. Tarsi long and slender, that of leg iii very much so. A blunt spur and a sharp spur on tarsus i; a sharp spur on tarsus ii; a long fine straight nude seta on tarsus iii.

Principal hosts: Goura pigeon (*Goura scheepmakeri* Finsch 1875), colonies on the head, Tawarin and Jamür, Dutch New Guinea, 1903; water chevrotain, mouse deer, *planduk* (*Tragulus borneanus* Miller 1902), colonies on the legs, Bode River, British North Borneo, August, 1939. Casual host: Man, North Celebes, 1903.

Genus GAHRLIEPIA Oudemans 1912.

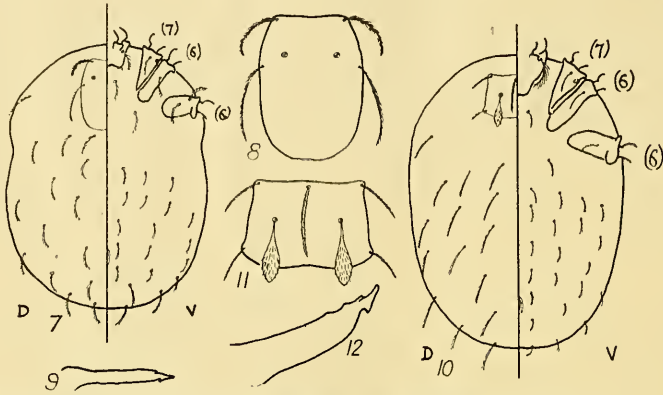
Ent. Ber. Nederl. Ver., iii, No. 67, 273.—*Typhlothrombium*, Oudemans, *ibid.*, iii, No. 56, 1910, 105.—*Schöngastiella*, Hirst, *Bull. Ent. Res.*, vi, 1915, 188.

Gater in 1932 discussed this genus, and stated that ". . . the number of scutal setae is not a sound criterion for the separation of genera in this group". He placed six new Malayan species in the genus, in spite of the fact that they had, respectively, 7 to 10, 7, 6, 4, 2, and 2 pairs of scutal setae; that in all six the palpal claws were trifurcate; and that four had two eyes on each side and two had none. (The classical description of the genus, based on a single species, *G. nanus*, specifies only one eye on each side, 5 pairs of scutal setae—3 pairs in *Schöngastiella*—and the palpal claw bifurcate.) There is the objection that, since their pseudostigmatic organs are missing, the placing of *G. ciliata*, *G. rutila*, and *G. turmalis* in this genus must be regarded as provisional only. Nevertheless, the other three are certainly correctly placed. It follows, therefore, that Gater's decision to re-include Hirst's *Schöngastiella* within the same genus, for similar reasons, is a good one also. The expanded conception of *Gahrliopia* would preferably be on the following lines: Larva with one dorsal median scutum; scutum large and tongue-shaped, much longer than broad; anterior portion occupied by the pseudostigmatic organs and two pairs of true scutal setae; posterior portion strongly salient, bearing a variable number of paired accessory scutal setae; pseudostigmatic organs capitate.

GAHRLIEPIA RIOI, n. sp. Figs. 7, 8, 9.

Body a broad rounded oval, widest at level of coxae iii, with a sharp, shallow constriction at each side two-fifths of the distance back. Striations coarse and moderately strong. Weak pitting on scutum, maxilla, and coxae. Colour orange. Only moderately engorged specimens were taken: L, 277 μ ; W, 204 μ ; largest seen, 292 \times 223 μ . Maxillary setae long, curved, with a few long branches on the convex side. Chelicerae short, straight, sharply pointed; dorsoapical tooth single, a small sharp barb; ventral tooth a rounded swelling only, proximal to the dorsoapical. A long slender nude seta on each cheliceral sheath. Palpi angular; a long curved seta with branches on the convex side on ii; a long nude seta on iii; on iv, a short, stout, nude seta near the base, a short branched seta half-way, and a similar seta near the apex. Appendiculum small, rounded, bearing 3 nude setae and 4 branched setae. Palpal claw trifurcate, the middle and dorsal elements straight with hooked points, the ventral shorter and finer. Scutum tongue-shaped; L, 75 μ ; W, 55 μ . Anterior margin straight or very slightly concave; anterior corners rounded; lateral margins slightly convex; posterior margin strongly salient; posterior corners almost straight. Scutal setae 4: the AL short, stout, curved, with long branches on all sides, set in the anterior corners; the PL longer, less curved, with branches on the convex side only, set in the posterior corners. AL, 28 μ ; PL, 40 μ . There are no accessory scutal setae. Pseudostigmata one-third of the distance back, in front

of the PL setae; 28μ apart. Pseudostigmatic organs missing from all specimens. No eyes. Body setae 72 (66 to 74); those of the dorsum and the last two rows of the venter long, stout, curved, with branches on the convex side; the remainder of the venter shorter and finer. Dorsum, setae 30, in rows as follows: 2, 6, 6, 6, 4, 4, 2. Venter, setae 42 (36 to 44), in rows as follows: 2, 2, 6 (0 to 8), 8 (6), 6, 6, 6, / 4, 2; rows 3 and 4 are



Figs. 7-9.—*Gahrlicpia rioi*, n. sp. 8, Scutum. 9, Chelicera.

Figs. 10-12.—*Neoschöngastia bodensis*, n. sp. 11, Scutum. 12, Chelicera.

irregular, the former sometimes being absent; the anus lies between rows 6 and 7; row 9 is on the posterior margin of the body. Only six segments in legs ii and iii; i, 135μ ; ii, 110μ ; iii, 140μ . Leg setae short, stout, curved, sharply tapering, with a few stout branches on the convex side. A single seta on coxae i and ii; two setae on coxae iii. Penultimate segments not unduly constricted or expanded; tarsi all short and blunt. A short, stout, blunt spur on tarsus i; that on ii finer and sharper; neither spur nor nude seta on iii.

Casual host: Water chevrotain, mouse deer, *planduk* (*Tragulus borneanus* Miller 1902). Bode River, British North Borneo, September, 1939; ten specimens embedded in the legs.

Type specimen at the School of Public Health and Tropical Medicine, University of Sydney.

Genus NEOSCHÖNGASTIA Ewing 1929.

Manual External Parasites, 187.

NEOSCHÖNGASTIA BODENSIS, n. sp. Figs. 10, 11, 12.

Body a broad oval, widest at level of coxae iii. Striations coarse and moderately strong. Pitting on scutum, maxilla, and coxae. Colour orange. L, 308μ ; W, 225μ ; only partly engorged specimens taken. Maxillary setae long and curved, with very long branches on the convex side. Chelicerae stout, tapering abruptly; the dorsoapical tooth single, small and sharp; a row of three blunt teeth along the distal third of the ventral surface—these ventral teeth are very small and indistinct in most specimens; they are in no respect comparable to the long row of closely-set dorsal teeth of the genus *Schöngastia*. A long slender nude seta on each cheliceral sheath. Palpi rounded, a short nude seta on ii; a long fine seta with one fine branch half-way down, on iii; on iv, one long branched seta. Appendiculum small, rounded, bearing 2 short stout nude setae and 4 very long stout branched setae. Palpal claw trifurcate, the middle element very stout, curved, and blunt; the dorsal element shorter, the ventral the shortest. Scutum oblong; L, 47μ ; W, 70μ . Anterior margin sinuate; anterior corners angular; lateral margins slightly concave; posterior margin convex, concave in the middle third; posterior corners angular. Scutal setae 5; the AM set back from the anterior margin, behind the AL, stout, with short branches; the lateral setae in the corners, shorter and finer. AM, 37.5μ ; AL, 25μ ; PL, 20μ . Pseudostigmata half-way back, 34μ apart. Pseudostigmatic

organs capitate, leaf-shaped, covered with long straight setules; L, 33μ ; head, $20.5 \times 11\mu$; stem, 12.5μ . Crest represented by short faint curved lines set obliquely in front of and behind the pseudostigmata, the posterior ones very indistinct. Ocular shield faint, 13μ to 19μ from scutum. Eyes double, the anterior the larger, opposite the pseudostigmata; the posterior very faint, opposite the PL setae. Body setae 76(80); those of the dorsum short, stout, with short branches on the convex side; those of the venter similar, but very short and fine. Dorsum, setae 30, in rows as follows: 2, 6, 6, 6, 4, 4, 2; row 7 is on the posterior margin of the body. Venter, setae 46(50), in rows as follows: 2, 2, 8(10), 8(10), 6(8), 8(6), 6, 4, 2. Legs long; only 6 segments in ii and iii; i, 146μ ; ii, 118μ ; iii, 167μ . Leg setae long, fine, with short branches on the convex side. Coxal setae single. Penultimate segments neither constricted nor expanded; all tarsi short and blunt. A long stout sharp spur on tarsus i; a shorter one on ii; neither spur nor nude seta on iii.

Principal host: Water chevrotain, mouse deer, *planduk* (*Tragulus borneanus* Miller 1902), colonies on legs, Bode River, British North Borneo, September, 1939.

Type specimen at the School of Public Health and Tropical Medicine, University of Sydney.

Neither the multiple ventral teeth nor the missing segments in the mid- and hind-legs appeal to the writer as of sufficient importance to warrant erecting a new genus. The latter condition is analogous to that found in *N. impar* and *S. oudemansi*.

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Reference.

GATER, B. A. R., 1932.—*Parasitology*, xxiv, 2, 161.
